Name: _____

at1121exam_practice: Radicals and Squares (v616)

Question 1

Simplify the radical expressions.

$$\sqrt{45} \qquad\qquad \sqrt{12} \qquad\qquad \sqrt{8}$$

$$\sqrt{3 \cdot 3 \cdot 5} \qquad\qquad \sqrt{2 \cdot 2 \cdot 3} \qquad\qquad \sqrt{2 \cdot 2 \cdot 2}$$

$$3\sqrt{5} \qquad\qquad 2\sqrt{3} \qquad\qquad 2\sqrt{2}$$

Question 2

Find all solutions to the equation below:

$$\frac{(x-6)^2 + 5}{7} = 3$$

First, multiply both sides by 7.

$$(x-6)^2 + 5 = 21$$

Then, subtract 5 from both sides.

$$(x-6)^2 = 16$$

Undo the squaring. Remember the plus-minus symbol.

$$x - 6 = \pm 4$$

Add 6 to both sides.

$$x = 6 \pm 4$$

So the two solutions are $x = 10$ and $x = 2$.

Question 3

By completing the square, find both solutions to the given equation. *You must show work for full credit!*

$$x^2 + 6x \;=\; 55$$

$$x^2 + 6x + 9 = 55 + 9$$
$$x^2 + 6x + 9 = 64$$
$$(x+3)^2 = 64$$
$$x + 3 = \pm 8$$
$$x = -3 \pm 8$$
$$x = 5 \qquad \text{or} \qquad x = -11$$

Question 4

A quadratic polynomial function is shown below in standard form.

$$y \;=\; 4x^2 - 40x + 94$$

Express the function in **vertex form** and identify the **location** of the vertex.

From the first two terms, factor out 4 .
$$y = 4(x^2 - 10x) + 94$$

We want a perfect square. Halve -10 and square the result to get 25 . Add and subtract that value inside the parentheses.
$$y = 4(x^2 - 10x + 25 - 25) + 94$$

Factor the perfect-square trinomial.
$$y = 4((x-5)^2 - 25) + 94$$

Distribute the 4.
$$y = 4(x-5)^2 - 100 + 94$$

Combine the constants to get **vertex form**:

$$y = 4(x-5)^2 - 6$$

The vertex is at point $(5, -6)$.